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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,131	08/01/2001	Li Young	LIY-103A	5687

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EXAMINER

BHAT, NINA NMN

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 09/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/920,131	Applicant(s) YOUNG, LI	
	Examiner N. Bhat	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4 rejected under 35 U.S.C. 102(e) as being anticipated by Salamon et al.

Salamon et al. teach a distillation system with individual fractionators try temperature control which includes one distillation column having a plurality of fractionation trays having feed input means, liquid removal means, and vapor removal manes wherein the plurality of trays include at least one heating element and a cooling element and control means for separate control of the heating elements for the trays. Specifically Salamon et al. teach in Figure 1 teaches the controlled flow of heat at each tray. the controls employed serve to thermostat each tray to a specific temperature.[Note Column 7, lines 25-32]. Salamon et al. teach that the distillation column (10) has a multiplicity of trays (11), a distillation bottom (28) and a distillation top (29). Each of the trays (11) includes a cylindrical vessel (12) wrapped with heat exchange coils (13), which is controlled to maintain each tray at specific controlled temperatures. A tandem heat pump system is utilized to control the temperature and heat flow in the distillation column between the trays. The heat pump will heat as well

Art Unit: 1764

as use refrigerant to cool and control the tray temperatures during distillation.[Note Column 9, lines 5-63].

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 5-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salamon et al.

Salamon et al. teach the invention substantially as claimed. Salamon et al. teach a staged optimal externally controlled system for controlling the temperature and heat flow on each tray in a distillation column. From Figure 1, it can be seen that each tray has control means, which controls the temperature and heat flow of each individual tray within the distillation column. The distillation system employs a plurality of thermostatted trays, which are maintained at a sequence of temperatures specified by maintaining equal thermodynamic distance between the trays. The system includes unique

employment of heat pumps. [Note Column 2, lines 58-62, Column 3, lines 19-25 and Column 7, lines 25-30]

However, Salamon does not teach that the cooling element is at least one open area within the tray which introduced coolant into the tray and one open area having a heat absorbent area and the cooling element having an outlet port for removal of the coolant the specific heat control and specific controllers for controlling the temperature of each tray.

Salamon teaches using a control system, which controls the temperature and heat flow of each tray and control of each tray in a fractionating distillation column. Using tandem heat pump system, which controls the heat flow in the distillation system, controls the heat flow and tray temperature. Salamon et al. teach that the use of additional heat sources or heat sinks improve the efficiency of distillation systems and the system provides a method and control system which minimizes energy consumption in a staged thermodynamic process by maintaining equal thermodynamic distances between each stage in the process. The method can include controlling the amount of heat transferred to or extracted from each stage, controlling the pressure of each stage or controlling the concentration of the reactant in each stage. Although, Salamon et al. does not teach applicant's specific tray construction and heat input and withdrawal structure, the concept of controlling the temperature and heat flow on each trays within the distillation column has been taught. Further with respect to applicant claims which include limitations regarding a programmable microprocessor, and specific temperature sensors etc., to select a controller program which will control the temperatures and

sense temperatures of each of the trays would have been obvious in view of the teachings of Salamon et al. who teaches a controlling heat pump can include an evaporator, a condenser, a compressor, and a throttling valve connected in series through a conduit. The throttling valve is adapted to circulate a refrigerant to perform a heat exchange cycle. The throttling valve is thermally connected to each of the trays and effective to control the amount of heat transferred to or extracted from the trays. Although, the controlling of the tray is not exactly the same, Salamon does teach the concept of providing a heating element or cooling element (heat pump). Controls are included for controlling each tray of the fractionation column, thus rendering applicant's invention as a whole obvious to one having ordinary skill in the art at the time the invention was made.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Halliday et al. teach control of a fractional distillation process, which controls the heat flow to the fractional distillation column to maintain a desired temperature at a selected tray. The flow and temperature controllers may utilize the various modes of control such as proportional, proportional-integral, proportional-derivate or proportional-integral-derivative controllers. Hobbs et al. teach a control of a fractional distillation column. Rhodes et al. teach automatic control of analytical distillation apparatus. Plaster et al. teach a factional distillation apparatus. Ryan et al. teach an energy saving distillation column. Smith teaches a method for measuring reflux flow in a distillation process. WO 98/35737 teach a staged optimal externally controlled system.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Bhat whose telephone number is 571-272-1397. The examiner can normally be reached on Monday-Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



N. Bhat
Primary Examiner
Art Unit 1764